CCNA Routing & Switching Certification

Descriptions and Course Outcomes of Cisco Academy CCNA Routing & Switching Program

CCNA R&S 1 – ITCC 1475 – Introduction to Networking

**Catalog Description:**
Introduce the architecture, structure, functions, components, and models of the Internet and other computer networks. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. By the end of either course, students will be able to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes.

**Learning Outcomes:**

- Understand and describe the devices and services used to support communications in data networks and the Internet.
- Understand and describe the role of protocol layers in data networks.
- Understand and describe the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments.
- Design, calculate, and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks.
- Explain fundamental Ethernet concepts such as media, services, and operations.
- Build a simple Ethernet network using routers and switches.
- Use Cisco command-line interface (CLI) commands to perform basic router and switch configurations.
- Utilize common network utilities to verify small network operations and analyze data traffic.

CCNA R&S 2 – ITCC1476 – Routing and Switching Essentials

**Course Catalog Description:**
This course describes the architecture, components, and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality. By the end of this course, students will be able to configure and troubleshoot routers and switches and resolve common
issues with RIPv1, RIPv2, single area and multi-area OSPF, virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks.

**End-of-course outcomes:**

1. Understand and describe basic switching concepts and the operation of Cisco switches.
2. Understand and describe enhanced switching technologies such as VLANs, VLAN Trunking Protocol (VTP), Rapid Spanning Tree Protocol (RSTP), Per VLAN Spanning Tree Protocol (PVSTP), and 802.1q.
3. Configure and troubleshoot basic operations of a small switched network.
4. Understand and describe the purpose, nature, and operations of a router, routing tables, and the route lookup process.
5. Understand and describe how VLANs create logically separate networks and how routing occurs between them.
6. Configure and troubleshoot basic operations of routers in a small routed network: A. Routing Information Protocol (RIPv1 and RIPv2) B. Open Shortest Path First (OSPF) protocol (single-area OSPF)
7. Configure and troubleshoot VLANs and inter-VLAN routing.
8. Understand and describe the purpose and types of access control lists (ACLs).
10. Understand and describe the operations and benefits of Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) for IPv4 and IPv6.
11. Understand and describe the operations and benefits of Network Address Translation (NAT).
12. Configure and troubleshoot NAT operations.
13. Configure and verify static routing and default routing.

**CCNA R&S 3 – ITCC2478 – Scaling Networks**

**Course catalog description:**

This course describes the architecture, components, and operations of routers and switches in a larger and more complex network. Students learn how to configure routers and switches for advanced functionality. By the end of this course, students will be able to configure and troubleshoot routers and switches and resolve common issues with OSPF, EIGRP, STP, and VTP in both IPv4 and IPv6 networks. Students will also develop the knowledge and skills needed to implement DHCP and DNS operations in a network.

**End-of-course outcomes:**

- Configure and troubleshoot DHCP and DNS operations for IPv4 and IPv6.
- Understand and describe the operations and benefits of the Spanning Tree Protocol (STP).
- Configure and troubleshoot STP operations.
- Understand and describe the operations and benefits of link aggregation and Cisco VLAN Trunk Protocol (VTP).
- Configure and troubleshoot VTP, STP, and RSTP.
• Configure and troubleshoot advanced operations of routers and implement RIP, OSPF, and EIGRP routing protocols for IPv4 and IPv6.
• Manage Cisco IOS Software licensing and configuration files.

CCNA R&S 4 – ITCC2479 – Controlling Networks

Course catalog description:

This course discusses the WAN technologies and network services required by converged applications in a complex network. The course enables students to understand the selection criteria of network devices and WAN technologies to meet network requirements. Students learn how to configure and troubleshoot network devices and resolve common issues with data link protocols. Students will also develop the knowledge and skills needed to implement IPSec and virtual private network (VPN) operations in a complex network.

End-of-course outcomes:

• Understand and describe different WAN technologies and their benefits.
• Understand and describe the operations and benefits of virtual private networks (VPNs) and tunneling.
• Configure and troubleshoot serial connections.
• Configure and troubleshoot broadband connections.
• Configure and troubleshoot IPSec tunneling operations.
• Monitor and troubleshoot network operations using syslog, SNMP, and NetFlow

Cisco Certified Network Associate (CCNA) Routing and Switching is a certification program for entry-level network engineers that helps maximize your investment in foundational networking knowledge and increase the value of your employer's network. CCNA Routing and Switching is for Network Specialists, Network Administrators, and Network Support Engineers with 1-3 years of experience. The CCNA Routing and Switching validates the ability to install, configure, operate, and troubleshoot medium-size routed and switched networks.

Look at Cisco’s site for explanation of CCNA R & S exam numbers:
